seilles to the eastern extremity of the Islands of Hyères. No ship within a radius of from 30 to 40 kilometres could have escaped observation. With a cable of silk, the balloon could rise in calm weather to a height of 400 metres.

It is evident from the success of these experiments that captive balloons may be a most important aid to those who hereafter make use of them in naval warfare. The subject has attracted the attention of the naval authorities in Germany, and at Wilhelmshaven a captive balloon was sent up recently from the *Mars*. We are glad to learn that the English Admiralty has taken up the question.

THE COCO-DE-MER IN CULTIVATION.

With only one exception, the palms of the Seychelles have long since proved amenable to cultivation in our tropical plant-houses. The genera *Stevensonia*, *Verschaffeltia*, *Roscheria*, *Latania*, *Dictyosperma*, *Acanthophœnix*, *Hyophorbe*, and *Chrysalidocarpus*, which are peculiar to this small group of islands, and which rank amongst the noblest of a noble family, are all well known in European collections of palms, their cultivation presenting no more difficulty than that of tropical plants generally. The coco-de-mer or double cocoa-nut (*Lodoicea seychellarum*) has, however, so far proved unmanageable under artificial treatment, notwithstanding that many attempts have been made to establish it at Kew and elsewhere. So long ago as the year 1827, Sir William Hooker published a series of figures and a description of the coco-de-mer in the *Botanical Magazine*, and recorded the arrival of living nuts of it at Kew, where, he says, "we cannot doubt of soon seeing them flourishing in our stoves." But they failed to grow, and although dozens of nuts have since been tried at Kew, not one ever got beyond the first stage of germination.

The absence from our collections of living examples of this most remarkable palm is most disappointing to all students of the order. At Kew we have lately been successful in establishing living plants of the Ita (*Mauritia flexuosa*) and Bussu (*Manicaria saccifera*) palms of the Demerara swamps, and the Doum (*Hyphæne thebaica*) and Palmyra (*Borassus flabelliformis*) palms of Africa. These successes stimulated the desire once more to obtain a living plant of the coco-de-mer.

Application was therefore made in January last year, through the Secretary of State for the Colonies, for a supply of fresh nuts from the Seychelles, and at the same time directions for packing and forwarding the nuts were sent to Mr. C. Button, the Conservator of Forests at those islands. The Administrator, Mr. T. Risely Griffith, took a warm interest in the matter, and through his kind exertions several consignments of nuts were received, of which four germinated. Two of these are probably too weak to live, but the other two are in a most promising condition. The strongest has a radicle 3 feet 8 inches long, and 12 inches in circumference at the end where the plumule is developed. This is now a foot long, and is pushing a perfect leaf.

In a note by the late General Gordon on the germination of the double cocoa-nut, it is stated that the nut is planted horizontally, without the husk, when it sends out a sprout some 12 feet long, which pushes up the young plant at a distance of 12 feet from the nut. The longest "sprout" we have had at Kew has not exceeded 4 feet. Nor can it be made to grow horizontally, the point turning down perpendicularly however often its position may be altered. At Kew the nuts were planted in a bed of cocoa-nut fibre, and kept at a temperature of 80°–85° F. They were planted in June 1889

Mr. Button had kindly undertaken to plant a nut in a Wardian case, and treat it according to our instructions until it had germinated and developed the plumule before despatching it to Kew. A nut thus treated arrived in July last in the most promising condition. The radicle is 1 foot 10 inches long, and the plumule is 7 inches in circumference at the base. It has a stout sheath-leaf, and a normal leaf 3 feet 2 inches long, 3 feet wide, with thirty-six folds. The midrib is curved, and the blade at present folded double. The texture is exceptionally firm, and the colour a deep green.

Full-sized trees of the coco-de-mer attain as much as 150 feet in height, with a smooth trunk about a foot in diameter. The leaves form an immense crown on the top, and each leaf is 20 feet long and 10 or 12 feet wide. The male and female flowers are on separate plants: the male inflorescence is shaped like a huge willow catkin, its length being 5 to 6 feet by 4 inches in diameter; the female is from 2 to 4 feet long, and it bears from six to ten fruits, each of which weighs from 25 to 30 pounds. They take seven years to mature, and sometimes hang two years on the tree after they are ripe. The process of germination extends over about two years. According to General Gordon, the trees begin to fruit when about forty years old, and attain maturity in 120 years.

Royal Gardens, Kew. William Watson.

[The coco-de-mer is at present confined to Praslin and Curieuse, two of the islands of the northern group of the Seychelles Archipelago. It undoubtedly runs some risk of extinction from the long period which the nuts take to germinate, and from the fact that, the trees being of different sexes, isolated females may easily escape fertilization. Its cultivation in the Botanic Gardens of the tropics is therefore of considerable importance.

Plants have long flourished in the Royal Botanic Gardens at Peradeniya, and the following extract from a letter from the Director, Dr. Trimen, F.R.S., to Kew, records the interesting circumstance of a male plant having flowered:—

"*Peradeniya*, August 12, 1890.

"You will be interested to hear that one of our Lodoicea palms put out a ♂ inflorescence last month. The tree is thirty-nine years old. To my great disgust, when the spike was about 6 inches long, some visitor cut it off with a blunt knife, and I found it on the ground. The flowers were all formed, and the structure exactly as described by Sir W. Hooker in the *Botanical Magazine*. I hope my other tree will prove ♀, but that is much younger."

Sir John Kirk also succeeded in establishing the palm in his garden at Zanzibar.

The Government of the Seychelles has long watched with care the preservation of the existing groves of the palm, and pains are now taken to fertilize the female plants artificially, and to plant the seeds.—W. T. T. D.]

NOTES.

We have to announce the death of Pierre de Tchihatchef, which took place at Florence on the 13th ultimo. This gentleman was perhaps best known as a botanist, though his principal literary work, "Asie Mineure: Description Physique, Statistique, et Archéologique de cette Contrée," took a much wider range. Prior to 1857, he travelled ten years in Asia Minor and Armenia, and, besides the work named, he published a large number of separate papers on a variety of subjects, chiefly however on botany and geology, commencing in 1840. Like so many Russians, he appears to have been an accomplished linguist, and wrote German and French with equal facility. He resided some years in France, and was one of the original members of the Botanical Society of France, founded in 1854. His "Botany of Asia Minor" forms the third part of the work named above, and consists of two volumes of letterpress, and a volume of plates by Riocreux. Pierre de Tchihatchef was also the author of an admirable French translation of Grisebach's "Vegetation der Erde." But this was something more than a translation, for it was cast in a better mould than the original, and contained much new matter, including an essay on the geological formation of oceanic islands.

We regret to have to record the death of Dr. Alexander John Ellis, F.R.S. We reprint from the *Times* the following notice of his career:—Dr. Ellis, whose original name was Sharpe, died at his residence in Auriol Road, West Kensington, on October 28. He was born in Hoxton in 1814, and educated at Shrewsbury, Eton, and Trinity College, Cambridge, of which he was elected a scholar in 1835, and graduated B.A., being sixth wrangler and first in the second class in classics, in 1837. He was elected a Fellow of the Cambridge Philosophical Society in 1837, of the Royal Society in 1864 (being a member of the Council for 1880–82), of the Society of Antiquaries in 1870, of the College of Preceptors in 1873, and a life governor of University College, London, in 1886. He was President of the Philological Society during 1872–74, and also 1880–82. He was also a member of the Mathematical Society of London, of the Royal Institution, of the Society of Arts, and honorary member of the Tonic Sol-Fa College. Dr. Ellis was a voluminous author, his works including "The Alphabet of Nature," 1845; "Essentials of Phonetics," 1848; "Plea for Phonetic Spelling," 1848; "Universal Writing and Printing," 1856; "Early English Pronunciation, with special reference to Chaucer and Shakespeare," 1869–86; "Glossic," 1870; "Practical Hints on the Quantitative Pronunciation of Latin," 1874; "On the English, Dionysian, and Hellenic Pronunciation of Greek," 1877; "Pronunciation for Singers," 1877; "Speech in Song," 1878; together with numerous other works and tracts on music and phonetics. He received the silver medal of the Society of Arts for three papers in connection with the "Musical Pitch" at home and abroad.

Dr. F. R. Japp, F.R.S., Assistant Professor of Chemistry in the Normal School of Science, South Kensington, has been elected Professor of Chemistry at the University of Aberdeen.

At the Royal Institution of Great Britain, on Monday, Mr. Victor Horsley, F.R.S., was elected Fullerian Professor of Physiology for three years.

The Secretary of State for India has appointed Mr. Arthur W. Thomson, C.E., B.Sc., of the Glasgow and West of Scotland Technical College, to be Professor of Mechanism and Applied Science in the College of Science, Poona.

We are glad to learn that the accommodation at the disposal of the Botanical Department in the University College, London, has been greatly augmented. Hitherto, all the botanical work, other than lectures, has been confined to the single general laboratory in the north cloister. In the adjacent Birkbeck building, from which the school of technological chemistry has been transferred to another portion of the College, several rooms have now been set apart for the various branches of botanical teaching; and the room in the north cloister has been fitted as a museum and general botanical laboratory. During the building operations, just concluded, the workmen found three large chests in which Prof. Lindley (who died in 1865) had stowed away a series of fossil types, representing the chief genera of plants occurring in the Coal-measures. This collection is, of course, a valuable accession to the botanical museum.

On Monday the Corporation of Brighton obtained formal possession of the museum in Dyke Road, containing the collect tion of British birds formed by the late Mr. E. T. Booth, and bequeathed by him to the town. A large assembly, including some specially invited men of science from London, gathered on the occasion. The key of the building having been handed to the Mayor of Brighton, Alderman Manwaring, he said that he trusted the collection was the beginning of such a natural history museum as no other town in the kingdom could boast of possessing. The gathering was addressed by Prof. Flower, of the British Museum, who said the collection was in many respects unrivalled in the kingdom. The homes in which the birds dwell were carefully and accurately reproduced in a manner that had never before been achieved. In that museum some of the specimens of taxidermy were very fine. All were above the average, and he did not believe there was a single bad one among them. It would have been a national calamity for such a collection to be dispersed or destroyed, and when it was offered to the British Museum he should have advised the Trustees to take it over had it not been intimated to him that the Corporation of Brighton were willing to take it and maintain it for the future benefit of mankind. Though it would have been a great privilege to him to be its official guardian, he rejoiced to find it was going to remain in Brighton, where it was formed, and in the neighbourhood of which many of the specimens were obtained.

The following have been elected as officers of the Cambridge Philosophical Society for the ensuing year: President:—Prof. G. H. Darwin, F.R.S. Vice-Presidents: J. W. Clark, Trinity; Prof. Babington, F.R.S., St. John's; Prof. Liveing, F.R.S., St. John's. Treasurer: R. T. Glazebrook, F.R.S., Trinity. Secretaries: J. Larmor, St. John's; S. F. Harmer, King's; E. W. Hobson, Christ's. New Members of Council: Dr. Alex. Hill, Downing; Dr. A. S. Lea, Caius; A. Harker, St. John's; L. R. Wilberforce, Trinity.

The Meteorological Council have published the meteorological observations made at stations of the second order (*i.e.* observations taken at 9h. a.m. and 9h. p.m. each day) for the year 1886. The present volume differs in several important particulars from those of previous years: the distribution of stations is much more complete, for, although the number for which observations in detail are published has been reduced, on the other hand the summarized observations have been considerably increased, and include the records from the observatories in connection with the Office. Some alterations will also be found in the tables, both as regards the information given and the form in which it appears: the barometer observations are no longer reduced to sea-level, owing to the uncertainty which attaches to the formula for reduction when the height of the station is considerable. In the hygrometrical values, the differences between dry- and wet-bulb readings are given under the heading of "Depression of Wet Bulb." In other respects, the general plan of the publication is the same as in previous years, and includes observations made at some selected stations of the Royal and Scottish Meteorological Societies.

In the *Bollettino Mensuale* of the Italian Meteorological Society for September, Prof. P. Busin publishes the results of his discussion of the diurnal probability of rain, calculated from long series of observations for three of the principal Italian cities, obtained by dividing the number of days of rain in a given period by the number of years of observation for the same period. He concludes that the tables show that barometric depressions do not bring rainy weather, or anticyclones fine weather, so frequently as generally supposed, and that such tables are more to be relied on by agriculturists than telegraphic forecasts of rain, owing to the variability of this element in adjacent localities. Although we cannot entirely agree with this view, there can be little doubt that such investigations may be valuable aids to the study of weather changes, if used in connection with telegraphic information of existing conditions.

We have received two pamphlets on the "Aurora" and "Forces concerned in the Development of Storms," by Mr. M. A. Veeder. In the former he finds that the phenomena depend on the rotation of the sun, and he mentions the remarkable coincidence in time of their sudden appearance and gradual fading with the solar disturbances that appear on the sun's eastern limb. He also suggests that thunderstorms "may be a reciprocal or alternative method of manifestation of forces, which, under other conditions, find their expression in the aurora." In the latter pamphlet, the working hypothesis adopted is that the distribution of atmospheric pressure as a whole may be determined to an important extent by the fact that the earth is a magnet, and that its magnetic properties are variable. In fact, convection-currents are of secondary importance, for he says that "the bringing of warm air from the tropics, or the bringing of cold air from the polar regions, is the effect, and not the cause, of the redistribution of pressure." Thus, if these magnetic forces, associated with magnetic induction from the sun, influence the atmosphere and mass it together in any particular way, equilibrium is maintained as long as these forces do not vary, but, as soon as they do, readjustment sets in, and eddies, storms, &c., are the result.

THE latest Report on the economical condition of Switzerland, from the British Legation at Berne, refers to the subject of technical education in that country. Subventions to the amount of £12,854 were granted by the Federal Government during the past year to the various technical schools existing in the different cantons. Among the more important of these schools is the Technikum at Winterthur, the various silk and cotton weaving schools in the cantons of Zürich, Basle, &c., and the schools of horology in the cantons of Geneva, Berne, and Neuchâtel. The Federal Government have, moreover, on more than one occasion been invited to consider the question of subsidizing schools of commerce, and applications for financial assistance have been addressed to them by the cantons of Geneva and Zürich, in which schools of this nature are already established. The Federal Council, while admitting that it is their duty to encourage in every way the establishment of schools in which youths may be trained for the various branches of commercial life by an education especially adapted to that end, have nevertheless decided that they would not be justified in thus adding to the expenses of the confederation until the equilibrium has been restored in the Federal budget.

WITH reference to our note, last week, about scientific guide-books, a correspondent writes:—"For Switzerland I should like to recommend the 'Botanist's Vade-Mecum,' published by the 'Librairie Saudoz' of Neuchâtel. It was compiled by Mr. Paul Morthier, Professor of Botany at the Neuchâtel Academy, and President of the International Society of Botanists. It has already passed through two or more editions, and the price is about 2*s.* 6*d.*"

MESSRS. CASSELL have issued, for the National Association for the Promotion of Technical and Secondary Education, a "Guide to Evening Classes in London." This compilation ought to be of great service to what is now, happily, a large class of students. Full information is given as to all the chief classes, elementary and advanced, that are to be held during the coming winter in the capital.

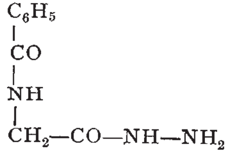
A SUPPLEMENT to the third volume of the *Internationales Archiv für Ethnographie* has been issued. It consists of some interesting ethnographical notes, by Dr. Max Weber, on Flores and Celebes. The paper is admirably illustrated.

A WEEKLY review, entitled *L'Université de Montpellier*, is about to be issued at Montpellier. It will contain information concerning the University; an abstract of the most interesting lectures in science, literature, and art; and original papers by men of science in the town and neighbourhood.

THE following is a list of the edible fungi exhibited for sale in the market of Modena during 1889:—*Amanita cæsarea, A. ovoidea, A. strobiliformis, Lepiota excoriata, L. naucina, Armillaria mellea, Pleurotus ulmarius, P. glandulosus, Entoloma Rhodopolius, Pholiota mutabilis, P. Aegerita, Psalliota campestris, Morchella esculenta, M. conica, M. rimosipes, Helvella monachella, H. crispa, Peziza vesiculosa, P. cerea, P. Acetabulum, Tuber magnatum, T. æstivum, Balsamia vulgaris.* By far the greater number of these species are also natives of Britain.

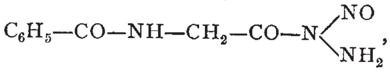
M. KUZNETSOFF, who has spent several years in the study of the flora of the Caucasus, sets forth in the last issue of the *Izvestia* of the Russian Geographical Society the following interesting conclusions:—The flora of the Kutais and Tchernomorsk regions, on the eastern coast of the Black Sea, belongs, as already known, to the Mediterranean region of evergreen trees. Next comes the region of West European flora, characterized by the extension of the beech-tree, and offering on the slopes of the mountains the very same subdivisions as we are accustomed to see in the Alps. That region extends over the provinces of Kuban and Terek as far east as the water-parting between the Terek and Sulak rivers. The territory to the east of it was formerly thought to have a flora more akin to that of Asia, but a distinctly European flora appears again on the eastern slopes of the Daghestan plateau turned towards the Caspian Sea; while the dry Daghestan plateau itself has a flora decidedly recalling that of the highlands of Central Asia. M. Kuznetsoff explains these differences by the moister climate of the Caucasus highlands, due to the proximity both of the Black and of the Caspian Sea. But it may also have a deeper cause. In fact, the plateaus of Daghestan cannot but appear to the orographer as a continuation of the geologically oldest plateaus of Asia Minor, now separated from the main plateau by the relatively much younger chain of the Caucasus. Referring to the vegetation of the Caucasus during the Tertiary epoch, when the Caucasus was a vast island surrounded by Tertiary seas, M. Kuznetsoff considers that the flora of Daghestan has undergone the greatest change since the Tertiary epoch. The floras of both the Western and the Eastern Caucasus have maintained more of their old characters, owing to less change having gone on in their climate, which has remained moist; and the vegetation of the Black Sea coast, which has a climate very much like that of the Japan archipelago, has retained still more of the aspects it had during the Tertiary epoch. Further exploration will be necessary to show how far climate alone can account for the present characters of the flora of Caucasus.

FURTHER details are given by Prof. Curtius in the current number of the *Berichte* concerning his new gas, hydrazoic acid, N_3H. Since the first announcement, a better and much readier mode of preparing the gas has been discovered. Instead of reacting with hydrazine hydrate upon benzoylglycollic acid, it is found much more convenient to commence by preparing the hydrazine derivative of hippuric acid,



$$\begin{array}{l} C_6H_5 \\ | \\ CO \\ | \\ NH \\ | \\ CH_2{-}CO{-}NH{-}NH_2 \end{array}$$

a substance much more readily obtained. This compound is converted into its nitroso-derivative,



$$C_6H_5{-}CO{-}NH{-}CH_2{-}CO{-}N\begin{array}{l}\diagup NO \\ \diagdown NH_2\end{array},$$

by treatment with sodium nitrite and acetic acid at a temperature about 0° C. Nitroso-hippurylhydrazine is much more permanent than the corresponding nitroso-compound of benzoylhydrazine, used in the earlier experiments, and the yield is 90 per cent. of the theoretical. The well-washed crystals of this nitroso-compound are next dissolved in dilute caustic soda, and the solution warmed for a short time upon the water-bath. The alkaline solution is afterwards placed in a flask connected with a condenser and fitted with a dropping funnel. Dilute sulphuric acid is now allowed to slowly drop into the liquid, which is maintained at the boiling temperature. Under these circumstances an aqueous solution of hydrazoic acid distils over. The distillate is allowed to flow into a solution of silver nitrate, when the silver salt, silver azoate, N_3Ag, is precipitated. The silver salt is afterwards dried at 60°–70°, at which temperature no danger attends the operation, and decomposed by sulphuric acid diluted with eight times its volume of water, when hydrazoic acid gas is liberated, contaminated with only a trace of moisture. It appears that the aqueous solution of the free acid is almost as explosive as the silver and mercury salts. Upon one occasion, when attempting to fuse the drawn out end of a tube containing about 2 c.c. of a 27 per cent. solution, Dr. Curtius had a very narrow escape of serious injury, the whole exploding with a fearful detonation, and shattering the glass tube into dust. Several of the azoates explode when a beam of coloured light is thrown upon them ; thus barium azoate, BaN_6, explodes when exposed to a strong green light, as does also the still more explosive silver azoate. A concentrated solution of hydrazoic acid appears to be able to dissolve gold, with formation of a red solution of gold azoate.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♀) from India, presented by Mr. Charles E. Flower ; an Azara's Fox (*Canis azaræ* ♂) from South America, presented by Mr. H. M. Dodington ; an Alligator (*Alligator mississippiensis*) from the Mississippi, presented by Mr. A. Schafer ; two Black-faced Spider Monkeys (*Ateles ater* ♀ ♀) from Peru, deposited.

OUR ASTRONOMICAL COLUMN.

THE ROTATION OF VENUS.—M. Perrotin, the Director of Nice Observatory, presented a note on the rotation of the planet Venus, at the meeting of the Paris Academy held on October 27. The observations described in the note were undertaken for the purpose of testing the conclusions recently arrived at by Signor Schiaparelli. They extend from May 15 to October 4. In the interval the planet has been observed on 74 days, and 61 maps made of its appearance. The whole of the observed facts leads M. Perrotin to the following conclusions :—

(1) The rotation of the planet is very slow, and is made in such a way that the relative position of the spots and terminator do not experience any notable change during many days.

(2) The time of rotation of the planet does not differ from its sidereal period of revolution (about 225 days) more than thirty days. My observations will easily accommodate themselves, however, to a rotation of which the period is from 195 to 225 days.

(3) The axis of rotation of the planet is almost perpendicular to the plane of its orbit. The displacement of the white region observed at the northern edge indicates that the difference does not exceed 15°, as was admitted by Schiaparelli.

These conclusions, therefore, support those deduced by Schiaparelli from an extended discussion of all the observations of the planet.

SPECTRUM OF THE ZODIACAL LIGHT.—Prof. C. Michie Smith has published a series of observations made at Madras of the spectrum of the zodiacal light (Proc. Roy. Soc. Edinburgh, April 7, 1890). He used a spectroscope specially designed for observing and photographing this spectrum, and records :—"In all my observations, which have been carried on at intervals since 1875, the spectrum has appeared continuous and free from bright lines except during the spring of 1883, and even then the lines were not seen with sufficient distinctness to make their existence certain. The estimated position of the supposed line, wave-length 558, differs but little from that of the auroral line (wave-length 556·7) which was observed by Angström in the zodiacal light spectrum in 1867. He was, however, observing at Upsala, where the auroral spectrum can often be seen in almost all parts of the sky, even when the aurora itself cannot be detected. . . . There would seem to be very little risk of obtaining the auroral spectrum in Madras, and I think that if the bright line seen was real, and not imaginary, it must have been due to the zodiacal light "

These observations indicate a periodic appearance of the 558 line in the zodiacal light spectrum. They also support the idea that the origin of the line is the first fluting of manganese at λ 5576.

D'ARREST'S COMET.—This faint comet (*d* 1890), re-discovered by Mr. Barnard on the 6th ult., may be observed near the following positions :—

Ephemeris for Greenwich Midnight.

1890.		R.A.		Decl.
		h. m. s.		° '
Nov. 8	...	21 24 31	...	−27 13·0
12	...	39 15	...	26 40·3
16	...	53 32	...	26 1·4

THE INSTITUTION OF MECHANICAL ENGINEERS.

ON Wednesday and Thursday evenings of last week, the 29th and 30 ult., a general meeting of the Institution of Mechanical Engineers was held. The chief business was the reading and discussion of the following two papers : on tube-frame goods waggons of light weight and large capacity, and their effect upon the working expenses of railways, by Mr. M. R. Jefferds, of London ; and on milling cutters, by Mr. George Addy, of Sheffield.

Mr. Jefferds is an American engineer who has come over to this country with a view to introduce the tube-frame waggon into England. It should be explained that the tube-frame differs from the ordinary frame of an English railway truck chiefly in the fact that, in place of the timber sole-bars with which we are acquainted, there are used eight wrought-iron tubes, 2⅞ inches in diameter, each pair forming one sole-bar, and suitably connected and supported by malleable cast-iron parts. The boldness with which these castings are used in a structure upon which so much depends bears testimony to the superiority of American foundry practice and to the courage of American designers in perhaps about equal proportions. Certainly no Great George Street engineer would venture upon putting annealed castings in such a position ; and, if he did, he would, no doubt, meet with disaster. The tube-frame waggons have, however, been largely built and extensively used in America, and we understand from Mr. Jefferds that there is no reason to think that the castings are not suitable for the work.

The interest in the paper, to judge by the channel into which the discussion was turned, did not centre so much in the constructive details of the waggon described as it did upon the general policy of the American as against the English methods of handling railway freight. In the United States, as most people know, they go upon the principle of having large goods waggons, some even as long as 40 feet and capable of carrying 40 tons. These, however, would be of extreme dimensions, the more usual length being 32 to 34 feet, with a carrying capacity of 30 to 32 tons—that is, American tons of 2000 pounds to the ton. These waggons are mounted on a pair of bogies, each having four wheels. Our own goods trucks are something about 20 feet long, and are mounted on wheels with axles which are fixed with their axes parallel to the ends of the trucks. The English truck will carry 10 tons, and weighs, according to Mr. Jefferds, 8 tons. Mr. Jefferds is, however, a little out here. No doubt some 10-ton trucks weigh 8 tons, but Mr. Williamson, of the Great Western Railway, and Mr. T. Hurrey Riches, of the Taff Vale Railway, state the average weight of their 10-ton trucks to be 5 tons 5 hundredweight and 4 tons 17 hundredweight respectively. Still, making every allowance for errors of this nature, and the possibility of Mr. Jefferds having placed his case in the most favourable light, there is no doubt but that the Americans carry their merchandise over their railways with a far lower proportion of tare to paying load than is the case in England. It has been notorious for years that American railway rates are far below those of this country. We will, however, let Mr. Jefferds speak for himself by making selections from his paper, merely first pointing out the great importance of this question upon our national well-being.

The supremacy of Great Britain—indeed her existence as a Power—is founded upon cheap ocean carriage. We can carry goods across the sea at a lower price than any other people.